Meghalaya Board Science Sample Paper Class X

General Instructions:
This paper consists of three sections
Section-A has **1-10 question** carrying 2 marks each.
Section -B has **11-20 question** carrying 3 marks each.
Section-C has **21-24 question** carrying 5 marks each.
Marks are allotted to each section.

Section-A 2 MARKS QUESTIONS

1. Classify whether the reactions an acid and a base and rusting of iron is a slow or fast reaction.
Solution:Reaction between acid and base is a fast reaction whereas rusting of iron is a slow reaction.

2. What is the refraction of light?
Solution:
When light travel from one medium to another medium than it get diffract from its original path. This process by which a ray of light either move towards or away from its path while moving from one medium to another is known as refraction of light.

3. What is the SI unit of electric potential?
Solution: The SI unit of electric potential is volt and is represented by V.

4.(b) **Choose strong acid and strong base from the following:**
CH3COOH , NH4OH, KOH, HCL
Solution: HCl is a strong acid and KOH is a strong base.

5. Distinguish between polar and equatorial orbits for artificial satellites.
Solution:

Polar orbits	Equatorial orbits
Satellites which gather information uses polar orbits. polar orbits goes over the North and South Poles.	Satellites in geostationary equatorial orbit (GEO) orbit Earth around the equator at a very specific altitude.
The satellite in the polar orbit is faster One complete orbit may take as little as 3 or 4 hrs.	Equatorial orbit for artificial satellite allows them to complete one orbit in the same amount of time

	that it takes Earth to rotate once.

6. An electric iron has rate of 750 W, 220 V. Find the
(i) Current passing through it, and
(ii) its resistance, when in use

Solution:
Given, Power of the electric iron, P = 750 W
Voltage, V = 220 V
Current, I = ?
Resistance, R =?
According to the definition, P = V x I
Hence I = 750 / 220 = 3.409 A
Therefore, the current passing through it is 3.409 A

(ii) As, V = IR
Substituting the values, we get, R = V / I = 220 / 3.409
R = 64.53

7. What is 'liquor ammonia' ? Explain 'Fountain Experiment' to demonstrate the following properties of ammonia?
(i) high solubility in water.
(ii) its alkaline nature

8. The focal length of a concave lens is 20 cm. Find the distance at which an object 5 cm tall should be placed so that it forms an image at 15 cm from the lens and the size of the image formed.
Solution:
Given, f = -20 cm, h_o = 5 cm, u = ?, v = -15 cm, h_i = ?
According to the formula,
1/f = 1/v – 1/u
1 /20 = 1 / -15 – 1 / u
1 / u =1/ -15 – 1/ -20
1 / u = -4+3 / 60
1 / u = -1 / 60
Therefore, u= -60 cm
Hence, the object is at a distance of 60 cm from the lens.
size of the image,
hi / ho = v / u
hi = ho x v / u
hi = 5 x -15 / - 60 = 75 / 60
h_i = 1.25 cm

9 (a) Why is the solar cooker box covered with a plane glass plate?
(b) The energy of water flowing in a river is considered to be an indirect form of solar energy? Explain
(c) How is the fission of 92 U 235 nucleus brought about?

Solution:
a).Solar cooker box is covered with a plane glass plate, as it entraps the infra-red rays of the Sun within the solar cooker box due to green house effect to make the interior of the cooker hot.
b)Due to the heat energy generated by the Sun, the water evaporates from the water bodies. These water vapor forms the clouds and gain potential energy. When it rains, the potential energy of the clouds is converted into kinetic energy. Thus, the kinetic energy of water flowing in a river considered to be an indirect form of solar energy.
c).When an unstable nucleus **92 U 235** is bombarded with a slow moving neutron, it splits up into two medium size nuclei, release some neutron and an enormous amount of energy.

10. (a)What is meant by 'Electric Resistance' of a conductor?
(b) How does the resistance and resistivity change if a wire of length L and resistance R is stretched so that its length is doubled and the area of cross-section is halved.
Solution:
(a). Electric resistance of a conductor can be defined as the ratio of potential difference to the current flowing through that conductor, measured in ohms.
(b). Given, original length of the wire = L
Resistance = R, Area of cross section = A
(i)Hence, the new resistance is four times the original resistance.
(ii) Resistivity of a metal does not vary.

Section -B **3 MARKS QUESTIONS**

11.(a) Why is sulphuric acid called 'King of Chemicals'?
(b) Why is water be never added drop wise to concentrated sulphuric acid?
Solution:
b)The reaction between an acid and water is exothermic. When water is added to acid the heat produced will make the acid splash and may cause burns.

12.Define the term, critical angle. What is 'total internal reflection' and what are the conditions under which it takes place.
Solution:-
Critical angle: The angle of incidence of a ray in a denser medium whose angle of refraction is 90 degree in the rarer medium is known as critical angle.
Total internal reflection: When a ray travels from a denser medium to a rarer medium and the angle of incidence is greater than the critical angle, the refracted ray is totally reflected into the denser medium at the surface of separation. This phenomenon is called as total internal reflection.

Conditions under which total internal reflection takes place:
a. It occurs when the angle of incidence is greater than the critical angle θ_c and
b. when the rays of light travel from the denser to rarer medium.

13. (a) What is meant by a 'magnetic field'?
(b) How is its direction at a point determined?
(c) Explain with an example the direction of the magnetic field generated around a current carrying conductor.
(d) What is the direction of magnetic field at the center of a current carrying circular loop?
Solution:
ANS:-a. Magnetic field is defined as the space around a magnet where its influence is felt by another magnet or magnetic substance.
Magnetic compass is an instrument used to find out the direction of the magnetic field. It consists of a small magnetic needle, where the north pole of the magnetic needle gives the direction of the field.
ANS:-b.The direction of magnetic field at a point is determined by placing a small magnetic compass at that point. The direction of north pole of compass needle gives the direction of magnetic field at a point.
ANS:-c A thick copper wire is inserted through a rectangular card-board where iron filings are sprinkled on it.

- Close the key so that current is passed through the wire.
- The wire acts as a magnet, hence the iron filings align themselves showing concentric circles around the copper wire.
- These concentric circles represent the magnetic field due to the magnet.

Therefore, we can demonstrate the direction of the magnetic field generated around a current carrying conductor by the above activity.
ANS:-d Consider a current carrying circular loop.
The magnetic lines of force at the center of the coil are along the axis of the coil. If the current in the coil is anti clockwise the face of the coil towards the observer is the north pole and if the current in the coil is clockwise the face of the coil towards the observer is the south pole.

14. Name the term for transport of food from leaves to other parts of the plant.
Solution:
Trans-location is the term for transport of food from leaves to other parts of the plant may cause burns.

15. What is a neuron?
Solution:
Neuron is a structural and functional unit of nervous system. It is the largest cell of body.
It has three components
a)cell body
b) dendrites
c) axon

16. Describe the mechanism of blood clotting.

ANS:- Blood clotting is the mechanism that prevents the loss of blood at the site of injury or wound. The platelet cellsin blood circulates throughout the body and plug these leaks by helping to clot the blood at these points of injury to prevent it from excessive bleeding.

Mechanism of blood clotting:-

Injured tissue + Blood platelets →Release thromboplastin

Prothrombin (Inactive) →(Thromboplastin +Ca^{++} → Thrombin (Active)

Fribrinogen (Soluble) →Thrombin +Ca^{++} →Fibrin (Insoluble) (gel form)

Fibrin + Red blood corpuscles → Blood clot

17. State the two functions of the human kidney. Which procedure is used in the working of artificial kidney.

Solution:

The two vital functions of the human kidney are

1) Excretion - Metabolic wastes is excreted in the form of urine.

2) Osmoregulation - To maintain water quantity in all the parts of the body.

Haemodialys is used in the working of artificial kidney.

18. Name the two hormones secreted by pancreas and write its function

Solution: Insulin and Glucagon are the hormones secreted by pancreas.

Insulin hormone is used to lower the blood glucose and glucagon hormone is used to increase the blood glucose.

19. (a) What is fertilization? Distinguish between external fertilization and internal fertilization.

(b) Where does fertilization takes place in human beings?

Solution:

a). Fertilization is defined as the fusion of a male gamete (sperm) with a female gamete (ovum) to form a zygote during sexual reproduction.

Difference between:

EXTERNAL FERTILIZATION **INTERNAL FERTILIZATION**

External fertilization:	**Internal Fertilization:**
(1)The fusion of male gamete and female gamete occurs outside the body.	- The fusion of gametes occurs inside the body.
(2) Both individuals discharge their gametes outside the body.	-Only the male discharges sperms into female genital tract.
(3) Development occurs outside the body.	-Development occurs inside the body.

Example is Frog.	Examples: Human, Birds, Cattle, etc.

b). The site of fertilization in human beings is in the Fallopian tube of female reproductive system.

20. Define the terms :
(i) Analogous organs
(ii) Vestigial organ
(iii) Sex chromosome

Solution:

(i)Analogous organs:
The organs that are similar in appearance and perform the same function but differ in their fundamental structure and origin are called analogous organs.
Examples: Wings of birds and insects.

(ii) Vestigial organ:
Vestigial organs are the organs that have lost all or most of their functions during the course of evolution and that are not in use or less used at present.
Example: vermiform appendix is a vestige of the ceacum of Man.

(iii) Sex chromosome:
Sex chromosome is a chromosome that operates in the sex-determining mechanism of a species. Many animals have two different types of sex chromosomes .

Section-C **5 MARKS QUESTIONS**

21. (a) What is 'environmental pollution'?
(b)What is the difference between biodegradable and non-biodegradable pollutants.
(c) Choose the biodegradable pollutants:Sewage, DDT, radioactive waste, agricultural waste
Solution:
(a)Environmental pollution is an undesired change in the physical, chemical or biological characteristics of the natural environment due to man 's activities. This pollution may affect the soil, rivers, seas or the atmosphere.

(b)Differences are as follows.

Biodegradable	**Non- Biodegradable**
(1)These pollutants can be broken down into non-poisonous substances in nature by the action of	(1)These pollutants cannot be broken down into non-poisonous substances by microorganisms.

microorganisms.	
(2)They get recycled thus do not need any dumping sites.	(2)They cannot be recycled thus require dumping sites
(3)These are obtained from living things.	(3)These are obtained from non-living things.
(4)They cause minimum environmental pollution.	(4)They cause environmental pollution.

(c)Biodegradable pollutants are sewage and agricultural waste.

23. Suggest three ways to maintain a balance between environment and development to survive.
Solution:
The three ways to maintain a balance between environment and development to survive are as follows.
(1) Forest resources should be used in an environmentally and developmentally sound manner.
(2)The benefits of controlled exploitation of resources go to the people and the environment is also preserved.
(3) If the exploitation is too high, economic and social development will be faster but then environment will further deteriorate.
We should use natural resources cautiously so that economic growth and ecological conservation go hand in hand.

24. (a)Draw and label a diagram of a 'palisade.
(b) Name the two stages in photosynthesis.
Solution:
(b) The two stages in Photosynthesis are
(1) Light phase -- Dependent on light.
(2) Dark phase -- Not dependent on light